Fig. 4.

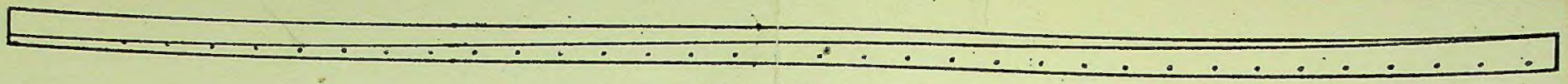


Fig. 5

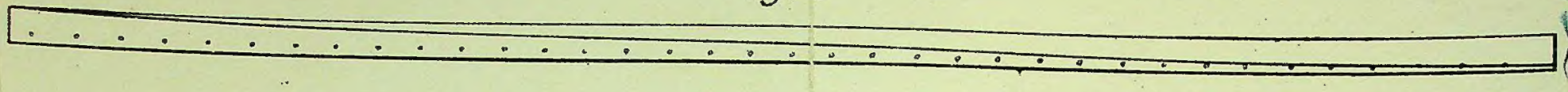


Fig. 1.

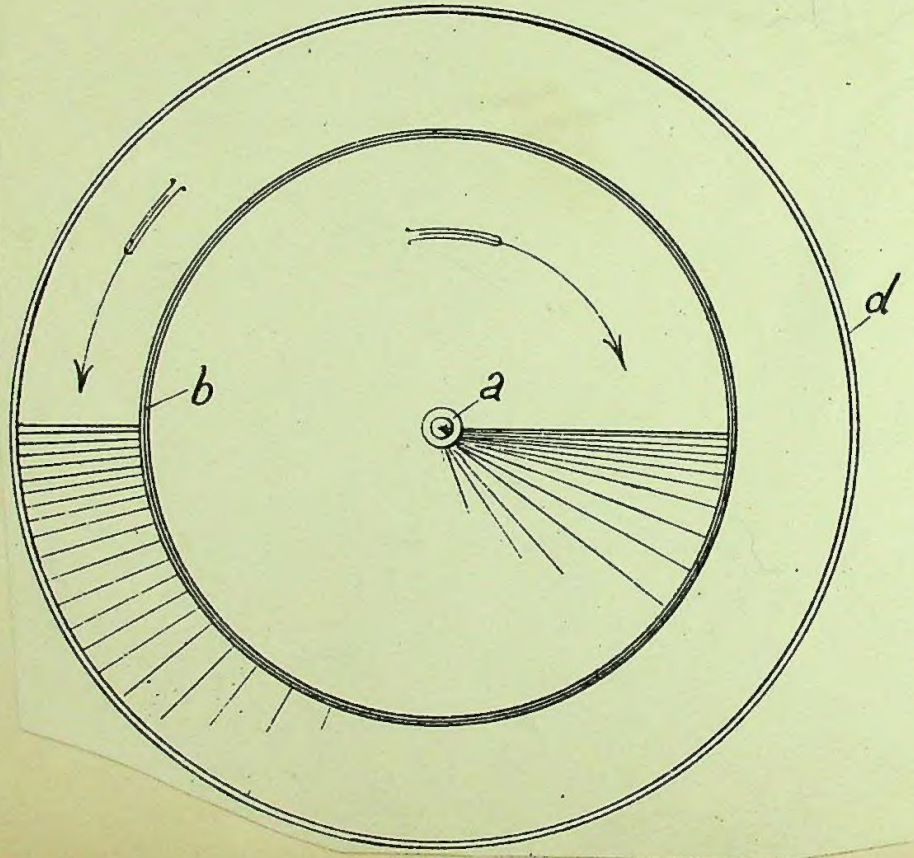


Fig. 2.

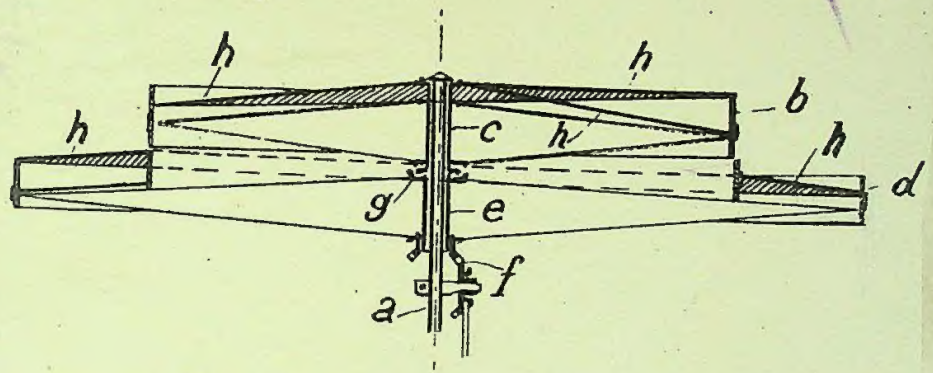
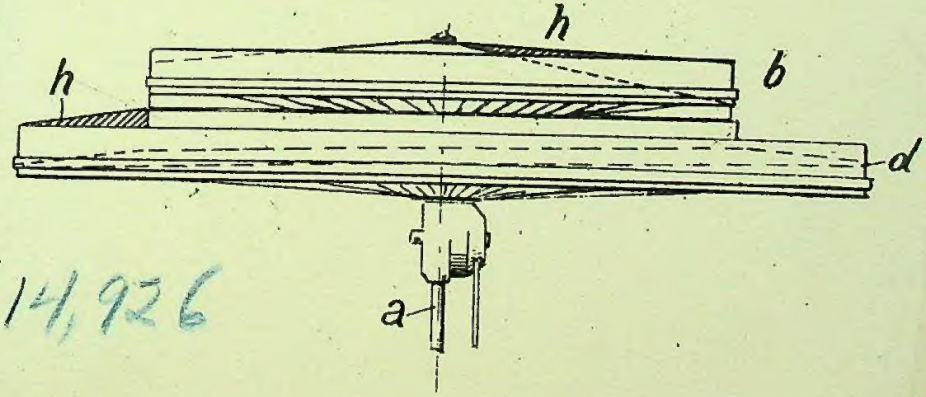


Fig. 3.



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DUPLICATE

N° 14,926 A.D. 1911

(*Under International Convention.*)

Date claimed for Patent under Patents and Designs Act, 1907, being date of first Foreign Application (in France), } *25th June, 1910*

Date of Application (in the United Kingdom), 26th June, 1911

At the expiration of twelve months from the date of the first Foreign Application, the provision of Section 91 (3) (a) of the Patents and Designs Act, 1907, as to inspection of Specification, became operative

Accepted, 18th Jan., 1912

COMPLETE SPECIFICATION.

Improvements relating to Helicopter Flying-machines.

I, Edouard Jean Bigourdan, of Charente-Inférieure, France, Engineer, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to an improved helicopter flying machine, and has for its object to provide an aero-machine which may be raised vertically, maintained in the air, and caused to follow any horizontal path.

The improved helicopter employed is composed essentially of two concentric circular planes mounted on a common fixed axis *a*, (see Figure 1, which is a plan, Figure 2, a vertical section, Figure 3, a side elevation).

The central plane is mounted on a circular frame *b*, fixed to a spindle *c*, supported in ball bearings on the vertical axis *a*. This circular plane is not absolutely at right angles to the axis *a*, but is slightly inclined and makes with the said axis *a*, an angle of about 85°.

The surface of the plane is helicoidal and its edge fixed to the felloe of the frame follows a spiral line.

The external circular surface is mounted on an external frame *d*, fixed to the spindle *e*, which is also mounted on the vertical axis *a*, in ball bearings. This external plane also forms an angle of about 85°, with the axis. Its surface is also helicoidal, the development of the edge of the surface being a straight line inclined to the horizontal.

The two helicoidal planes or wings revolve about the same axis but in opposite directions.

If the wheel *b*, turn from right to left, the wheel *d*, will turn from left to right, both planes acting as screws upon the air in a vertical direction whilst counterbalancing one another, so that the two movements mutually equilibrate one another and prevent the apparatus turning upon itself.

On the central fixed axis *a*, there is permanently attached the gondola carrying the motor, the aviator, and all supplies. The drive is transmitted to the spindle *e*, by the pinion *f*, and the two spindles *c*, and *e*, are connected mutually to drive one another by reversing gear enclosed in the case *g*. This gear and the mechanism for driving may be of any convenient type.

[*Price* 8*d*.]

Figure 2, is a section of the circular frames and planes, the lines *h*, indicating the transverse sections of the helicoidal planes, and the shaded portions the undersurfaces thereof.

Figure 4, is a development of the internal felloe, showing the development of the edge of the plane as a straight line.

Figure 5, is a similar development of the external felloe.

The apparatus herein described is stable and may be reversed in the air. Owing to its general disposition it forms a parachute for descending, the two wheels *b*, and *d*, being braked in any convenient manner to prevent their rotation.

The parachute effect may be increased by extending the planes so that the one overlaps the other, for instance, by an amount equal to about twice the distance between the two superposed and adjacent parts of the planes.

The above description relates to lifting planes, but similar forms of planes may also be used for propelling the machine laterally, these planes being preferably smaller in diameter but of greater pitch than the lifting planes and arranged to rotate about substantially horizontal axes.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. A helicopter composed of two concentric circular planes of helicoidal form, arranged to rotate in opposite directions about a common axis.

2. An arrangement of planes as claimed in Claim 1, adapted for propelling laterally a helicopter machine of the kind described.

3. The improved planes for use in aerial machines as hereinbefore described or illustrated in the drawings.

Dated this 26th day of June, 1911.

MATHYS & Co.,
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43, Chancery Lane, London, W.C.

Redhill: Printed for His Majesty's Stationery Office, by Love & Malcomson, Ltd.—1912.